REMARKS

Claims 1-41 are pending in this application and stand rejected. Claims 1, 15, 25, 30 and 36 have been amended in this response. No new matter has been added. No claims have been added Applicant respectfully requests reconsideration of this application and its pending claims in light of the amendments and the following remarks.

I. The § 103 Rejections

In the Office Action dated November 14, 2003, the Examiner rejected claims 1-41 under 35 USC 103(a) as being unpatentable.

A. Claim 1

Claim 1 stands rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** (U.S. Patent No. 5,838,634) in view of **Matteucci** (U.S. Patent No. 5,884,229) and **Tucker** (The Computer Science and Engineering Handbook, edited by Allen B. Tucker, Jr., 1997). Claim 1 has been amended to clarify the purpose of step (b). Support for this amendment is found throughout the Specification as originally filed. For example, the problem is discussed (in conjunction with a discussion of the prior art's approach to the problem) at page 1, paragraph 3 ("The estimation at any special location (x,y,z) of the value of a parameter (i.e., a random variable), such as porosity or permeability, from a set of scattered observations of data representing such a parameter may be achieved by a method known as 'Kriging.'" The next paragraph explains the smoothing problem of this prior art.). Paragraph 9 on page 3 of the Specification clarifies that "it is a primary feature of the present invention to generate one or more maps representing the characteristics of a gridded cross section…in response to a plurality of scattered data samples on such cross

section." The investigation is inherent in the process and the results of the investigation are depicted in Figures 33a-d, 34 a-d and 36-43, as originally filed. No new matter has been added. Applicant respectfully asserts this rejection is traversed.

Claim 1, as amended, recites:

> A method of generating a map illustrating a set of characteristics of a cross section through an earth formation representing a time slice or a horizon through said formation in response to a plurality of scattered data observations on said cross section representing a plurality of parameters located at a plurality of locations on said cross section, comprising the steps of:
> (a) gridding said cross section thereby generating a gridded cross section which includes a grid having a plurality of intersections and said <u>plurality of scattered data observations distributed among the intersections</u> of said grid on said cross section;
> (b) <u>investigating properties of the plurality of scattered data observations distributed among the intersections of said grid by obtaining a unique cumulative distribution function associated with each intersection of the grid</u> of the gridded cross section thereby producing a <u>plurality of cumulative distribution functions associated, respectively, with the plurality of intersections</u> of said grid;
> (c) choosing a value from each of the cumulative distribution function at each of the intersections of the gridded cross section thereby producing a plurality of values associated, respectively, with the plurality of intersections, and
> (d) assigning each value to its associated intersection of the gridded cross section and assigning a unique color to said each value thereby generating a map illustrating said set of characteristics of said cross section through said earth formation.

The Examiner states that **Jones** discloses "a gridded cross section" with its disclosure of a three dimensional array of cells and mention of "structural surfaces or horizons in the form of 2-D computer grids or meshes." (Office Action dated 2003-11-14 at 5.) The Examiner correctly notes that claim 1 of the instant application is not limited

to time slices but also includes horizons (Office Action dated Office Action dated 2003-11-14 at 3). The Examiner further points out:

> Additionally, second, the term "time slice" is a term of art in the geological field where properties of underground media are determined by reflected sound waves often generated by surface explosions). Time is proportional to the distance the wave has traveled and thus is proportional to depth. Thus, the term "time slice" in this context also appears to be referring to a horizontal cross section at a given depth. ... Also see Matteucci FIG 1 which displays "time" as the vertical axis.

Applicant agrees that the time axis can be proportional to depth and is shown, like depth, as a vertical axis. And a "time slice," by definition, would be a two dimensional, horizontal plane passing through a particular time value on the vertical time axis. Thus, a time slice would always be perpendicular to the vertical axis showing the time scale. In any case, use of time slices and horizons for geologic modeling, in general, are known in the art. And as the Examiner has previously pointed out, **Jones** mentions modeling horizons or structural surfaces with meshes or grids and grids inherently have intersections.

What **Jones** does not disclose is the following limitations in Claim 1, as amended:

"said plurality of scattered data observations distributed among the intersections of said grid on said cross section...

" investigating properties of the plurality of scattered data observations distributed among the intersections of said grid by obtaining a unique cumulative distribution function associated with each intersection of the grid of the gridded cross section thereby producing a plurality of cumulative distribution functions associated, respectively, with the plurality of intersections of said grid;:

"choosing a value from each of the cumulative distribution function at each of the intersections of the gridded cross section thereby producing a plurality of values associated, respectively, with the plurality of intersections, "

and does not disclose:

"assigning each value to its associated intersection of the gridded cross section and assigning a unique color to said each value thereby generating a map illustrating said set of characteristics of said cross section through said earth formation."

The Examiner asserts that **Matteucci** discloses the "cumulative distribution function" recited by Claim 1. Applicant would agree if limitation (b) of claim 1 was directed to the use of a cumulative distribution function in geologic modeling in general or the application of a cumulative distribution function to compare siesmic traces in particular. But Applicant respectfully asserts that the limitation of claim 1 includes a particular application of a cumulative distribution function, which is not disclosed by **Matteucci**. Claim 1 as amended recites

" <u>investigating the properties of the plurality of scattered data observations distributed among the intersections of said grid by obtaining a unique cumulative distribution function associated with each intersection of the grid</u> of the gridded cross section <u>thereby producing a plurality of cumulative distribution functions associated, respectively, with the plurality of intersections of said grid"</u>

Applicant respectfully points out the grid with its intersections is by definition (at least) a two dimensional plane, passing through the earth formation in a horizontal fashion (horizons may follow the contours of formations in the earth) and each intersection on the grid is, again by definition, a <u>point</u> on (at least) a two dimensional plane, <u>not a vertical line</u> passing through the grid. **Matteucci** discloses a particular and limited application: that of a cumulative distribution function <u>for a vertical, linear seismic trace</u>, not the cumulative distribution function for a point on a two dimensional horizontal plane, using scattered data observations on that two dimensional plane. **Matteucci** thus

does not disclose "investigating the properties of the plurality of scattered data observations distributed among the intersections of said grid" or "obtaining a unique cumulative distribution function associated with each intersection of the grid of the gridded cross section thereby producing a plurality of cumulative distribution functions associated, respectively, with the plurality of intersections of said grid," as recited by Claim 1, as amended.

In **Matteucci,** the analysis is focused on a comparison of seismic traces, which are vertical and, as traces are linear, are one dimensional. Note that each seismic trace is a response to sound waves bouncing off underground formations and can be seen as a vertical, wavy line **20**, passing through the formation in the z direction in **Mateucci**, **FIG. 1**. In **Mateucci**, one seismic data trace is selected as a "reference trace" and "all [seismic] traces falling within a specified distance from the reference trace are extracted from the survey, and one or more statistics which measure the similarity between the reference trace and each of the other traces are calculated. ... Finally, the calculated statistics are used to make a determination of whether or not the reflection character within the target interval of each of the extracted traces is the same as or different from the reference trace." (Matteucci, column 5, lines 29-44). To calculate such statistics, **Matteucci** discloses taking the cumulative distribution function of one trace (say the reference trace), subtracting the cumulative distribution function of another trace, and taking the maximum value of the absolute difference to calculate the Kolmogrov-Smirnov statistic, D (see Matteucci at column 6, line 58-column 7, line 16), which "measures the similarity of the amplitude distribution of the two seismic traces."

While **Mateucci** uses the cumulative distribution function of only a linear, vertical trace as a tool to calculate statistics to compare seismic traces (*see* Mateucci column 7, lines 2-15), this is a wholly different context from that of the present invention, where the cumulative distribution functions are taken at each intersection (and each intersection is a point, not a vertical line) of the grid on a plane. **Mateucci** is using the cumulative distribution functions to measure the similarity of two vertical seismic traces, not investigating properties of data scattered among a grid on a horizontal cross section through the formation.

If one were to combine **Jones** and **Mateucci**, the result would be a 3-D cube array or block, having horizons gridded but without any data among the intersections of the grid and with no further analysis of the gridded horizons. The array would have a plurality of seismic traces passing vertically through it and the invention would involve an analysis of the similarity of seismic traces using cumulative distribution functions and Kolmogorov-Smirnov statistics. This does not meet the limitations as recited by claim 1, as amended, which include "a plurality of scattered data observations distributed among the intersections of said grid on said cross section; … investigating the properties of the plurality of scattered data observations distributed among the intersections of said grid by obtaining a unique cumulative distribution function associated with each intersection of the grid … choosing a value from each of the cumulative distribution function at each of the intersections of the gridded cross section … and assigning each value to its associated intersection of the gridded cross section and assigning a unique color to said each value …" (Emphasis added.)

Nor does **Tucker** supply the deficiencies of **Jones** and **Mateucci**. While **Tucker** does disclose the use of color in "a particular slice of 3-D dataset," it does not disclose the use of color as recited in claim 1, that is. assigned to a value taken from the cumulative distribution function of an intersection on the grid of the cross section. Combining **Jones**, **Matteucci** and **Tucker** would result in a 3-D cube array or block, having horizons gridded but without any data among the intersections of the grid and with no further analysis of the gridded horizons. The array would have a plurality of seismic traces passing vertically through it and the combination would involve an analysis of the similarity <u>of seismic traces</u> using cumulative distribution functions and Kolmogorov-Smirnov statistics, with similar seismic traces being assigned similar colors.

While the Examiner states that one of ordinary skill in the art could combine disparate elements from each of the cited references to re-create the present invention, this could only be done, if at all, through the impermissible use of <u>hindsight</u>. One would have to look to the present invention to see how to cherry-pick the different elements from the references and use them in ways <u>not</u> taught by the references.

Accordingly, the combination of **Jones**, **Mateucci** and **Tucker** does not disclose "a plurality of scattered data observations distributed among the intersections of said grid on said cross section; ... investigating the properties of the plurality of scattered data observations distributed among the intersections of said grid by obtaining a unique cumulative distribution function associated with each intersection of the grid; ... choosing a value from each of the cumulative distribution function <u>a</u>t each of the intersections of the gridded cross section; ... and assigning each value to its associated intersection of the gridded cross section and assigning a unique color to said each value"

as recited by claim 1 (emphasis added). Thus claim 1 as amended is felt to distinguish patentably over the combination of the **Jones**, **Mateucci** and **Tucker** references.

B. Claim 2

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker** and **Journel** (Fundamentals of Geostatics in Vive Lessons," by Journel, vol. 8AGU, 1989). Applicant respectfully traverses this rejection.

As the Examiner mentions, claim 2 depends from claim 1 with three additional limitations, which are not disclosed by **Jones**: (b1) Krigging the gridded cross section thereby generating a plurality of expected values and a plurality of corresponding standard deviations <u>associated, respectively, with the plurality of intersections of the grid</u> of the gridded cross section; (b2) producing a probability density function associated with each expected value and each corresponding standard deviation generated from step (b1) thereby producing <u>a plurality of probability density functions corresponding, respectively, to the plurality of intersections of the grid</u> of the gridded cross section; and (b3) producing a cumulative distribution function associated with each probability density function produced from step (b2) thereby producing <u>a plurality of cumulative distribution functions corresponding, respectively, to the plurality of probability density functions which correspond, respectively, to the plurality of intersections of the grid</u> of the gridded cross section.

Claim 2 is dependent on claim 1 and contains all of its limitations so it, too, is felt to be distinguishable from the cited references. With respect to its additional limitations, the Examiner states that Krigging and probability functions are disclosed by <u>**Journal**</u> as described in the instant Specification, but the use of such tools as recited by claim 2 in

connection with being taken at and corresponding to intersections of the gridded cross section is not disclosed by **Journal**. While the Examiner asserts that it would be obvious to combine the cited references to achieve claim 2, this could only be done, if at all, with an impermissible use of hindsight. Without the benefit of hindsight, such a **Jones-Matteucci-Tucker-Journal** would result in a 3-D cube array or block, having horizons gridded but without any data among the intersections of the grid and with no further analysis of the gridded horizons. The array would have a plurality of seismic traces passing vertically through it and the combination would involve an analysis of the similarity of seismic traces using Kriging or the traces, calculating probability distribution functions of the traces, taking cumulative distribution functions and Kolmogorov-Smirnov statistics for the traces, with similar seismic traces being assigned similar colors. This combination would still fail to achieve the limitations of claim 2.

Claim 2 is felt to be patentably distinguishable from the cited references and Applicant respectfully requests reconsideration.

C. Claim 3

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker** and **Journel** and **Hogg** (Probability and Statistical Inference, by Hogg, Robert V and Tanis, Eliot A, 3d ed. 1988).

Claim 3 is dependent on claim 1 and contains all of its limitations so it, too, is felt to be patentably distinguishable from the cited references. The addition of **Hogg** does not affect this as the reference does not disclose the application of the statistical tool of choosing a probability from the cumulative distribution function in the circumstance where the cumulative distribution function is taken at an intersection of a grid on a

gridded cross section. Such an application is not disclosed by **Hogg**, which does not supply the deficiencies of the previously discussed references. Accordingly, Applicant respectfully asserts that this rejection is traversed and that claim 3 is patentably distinguishable from the cited references and requests reconsideration.

D. Claim 4

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker** and **Journel** and **Hogg**. Applicant respectfully traverses this rejection. Claim 4 depends from claim 2, contains all its limitations and is felt to be likewise patentable over the cited references. As described with respect to claim 3, the addition of **Hogg** does not supply the deficiencies of the previously discussed references. Therefore, Applicant respectfully asserts it has traversed this rejection and asserts claim 4 is patentably distinguishable from the cited references and requests reconsideration.

E. Claim 5

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker** and **Journel** and **Hogg**. Claim 5 depends from claim 2, contains all its limitations and is felt to be likewise patentable over the cited references. As described with respect to claim 3, the addition of **Hogg** does not supply the deficiencies of the previously discussed references. Therefore, Applicant respectfully asserts it has traversed this rejection and asserts claim 5 is patentably distinguishable from the cited references.

F. Claim 6

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker** and **Journel** and **Hogg.** Claim 6 depends from claim 2, contains all its limitations and is felt to be likewise patentable over the cited references. As described with respect to claim 3, the addition of **Hogg** does not supply the deficiencies of the previously discussed references. Therefore, Applicant respectfully asserts it has traversed this rejection and requests reconsideration.

G. Claim 7

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker** and **Journel** and **Hogg**. Claim 7 depends from claim 2, contains all its limitations and is felt to be likewise patentable over the cited references. As described with respect to claim 3, the addition of **Hogg** does not supply the deficiencies of the previously discussed references. Therefore, Applicant respectfully asserts it has traversed this rejection and requests reconsideration.

H. Claim 8

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker** and **Journel** and **Webber** (U.S. Patent No. 6,081,577). Claim 8 depends from claim 2 and contains all of its limitations, so it is felt to be likewise patentable over the cited references. **Webber** does not supply the deficiencies of the previously discussed references. While it does, as the Examiner points out, disclose the use of affine correction, it is in the context of the transformation of three dimensional matrix volumes and des not disclose "applying an affine correction to each of the values chosen from each of the cumulative distribution functions associated with each of the

intersections of the gridded cross section" as recited by claim 8. Therefore, Applicant respectfully asserts that this rejection is traversed and that claim 8 is patentable over the cited references and requests reconsideration.

I. Claim 9

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker** and **Journel** and **Webber**. Claim 9 depends from claim 8 and contains all of its limitations, so it is felt to be likewise patentable over the cited references. Therefore, Applicant respectfully asserts that this rejection is traversed and requests reconsideration.

J. Claims 10- 14

Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteuci** and **Tucker** and **Journel** and **Hogg**. Claims 10-14 depend from claim 9, contain all of its limitations, and so are felt to be likewise patentable over the cited references. Therefore, Applicant respectfully asserts that this rejection is traversed with respect to these claims and requests reconsideration.

K. Claim 15

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker,** for the reasons described with respect to claim 1. Claim 15 has been amended. No new matter has been added. Support for this amendment is found throughout the Specification as originally filed. For example, the problem is discussed (in conjunction with a discussion of the prior art's approach to the problem) at page 1, paragraph 3 ("The estimation at any special location (x,y,z) of the value of a parameter (i.e., a random variable), such as porosity or permeability, from a set of

scattered observations of data representing such a parameter may be achieved by a method known as 'Kriging.'" The next paragraph explains the smoothing problem of this prior art.). Paragraph 9 on page 3 of the Specification clarifies that "it is a primary feature of the present invention to generate one or more maps representing the characteristics of a gridded cross section...in response to a plurality of scattered data samples on such cross section." The investigation is inherent in the process and the results of the investigation are depicted in Figures 33a-d, 34 a-d and 36-43, as originally filed. Applicant respectfully asserts this rejection is traversed.

Claim 15 is an independent "Program storage device ... cross section claim" with limitations corresponding to those of claim 1. Therefore, claim 15 is felt to be patentably distinguishable from the cited references for the same reasons discussed above with respect to claim 1, i.e. that the cited references do not disclose or suggest "investigating properties of the plurality of scattered data observations distributed among the intersections of said grid by obtaining a unique cumulative distribution function associated with each intersection of the grid of the gridded cross section thereby producing a plurality of cumulative distribution functions associated, respectively, with the plurality of intersections of said grid" or "choosing a value from each of the cumulative distribution function at each of the intersections of the gridded cross section ...;" or "assigning each value to its associated intersection of the gridded cross section and assigning a unique color to said each value...." Therefore, Applicant respectfully asserts that this rejection is traversed.

L. Claims 16-24

Claims 16-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker**, and, variously, in combination with **Journel, Hogg** and **Webber** for the reasons described with respect to claims 2-14. Claims 16-24 are dependent, directly or indirectly, on claim 15 and contain all of its limitations. For the reasons described above with respect to claim 15 and claims 2-14, Applicant respectfully asserts that claims 16-24 are patentably distinguishable from the cited references and requests reconsideration.

M. Claim 25

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker**. . Claim 25 has been amended. No new matter has been added. Support for this amendment is found throughout the Specification as originally filed. For example, the problem is discussed (in conjunction with a discussion of the prior art's approach to the problem) at page 1, paragraph 3 ("The estimation at any special location (x,y,z) of the value of a parameter (i.e., a random variable), such as porosity or permeability, from a set of scattered observations of data representing such a parameter may be achieved by a method known as 'Kriging.'" The next paragraph explains the smoothing problem of this prior art.). Paragraph 9 on page 3 of the Specification clarifies that "it is a primary feature of the present invention to generate one or more maps representing the characteristics of a gridded cross section...in response to a plurality of scattered data samples on such cross section." The investigation is inherent in the process and the results of the investigation are depicted in Figures 33a-d, 34 a-d and 36-43, as originally filed. Applicant respectfully asserts this rejection is traversed.

Claim 25 is an independent apparatus claim with limitations corresponding to those of claim 1. Claim 25 is felt to be patentably distinguishable from the cited references for the same reasons discussed above with respect to claim 1, i.e. that the cited references do not disclose or suggest " a second apparatus responsive to said first gridded cross section adapted for Kriging said first gridded cross section thereby generating a second gridded cross section having a plurality of intersections wherein each intersection of said second gridded cross section includes an expected value of a parameter and a standard deviation; third apparatus responsive to said second gridded cross section for investigating the properties of the plurality of scattered observation data distributed throughout said cross section by generating a plurality of cumulative distribution functions associated, respectively, with said plurality of intersections of said second gridded cross section; and fourth apparatus adapted for selecting a plurality of values, respectively, from said plurality of cumulative distribution functions and for assigning said plurality of values and a plurality of unique colors to the respective plurality of intersections of said second gridded cross section thereby generating said map." Therefore, Applicant respectfully asserts that this rejection is traversed and requests reconsideration of this claim.

N. Claims 26-29

Claims 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker** and, variously, in combination with **Journel, Hogg** and **Webber** for the reasons described with respect to claims 2-14. Claims 26-29 are dependent, directly or indirectly, on claim 25 and contain all of its limitations. For the reasons described above with respect to claim 25 and claims 2-14, it is believed that

claims 26-29 are patentably distinguishable from the cited references and that this rejection is traversed.

O. Claim 30

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker** for the reasons described with respect to claim 1. Claim 30 has been amended. No new matter has been added. Support for this amendment is found throughout the Specification as originally filed. For example, the problem is discussed (in conjunction with a discussion of the prior art's approach to the problem) at page 1, paragraph 3 ("The estimation at any special location (x,y,z) of the value of a parameter (i.e., a random variable), such as porosity or permeability, from a set of scattered observations of data representing such a parameter may be achieved by a method known as 'Kriging.'" The next paragraph explains the smoothing problem of this prior art.). Paragraph 9 on page 3 of the Specification clarifies that "it is a primary feature of the present invention to generate one or more maps representing the characteristics of a gridded cross section...in response to a plurality of scattered data samples on such cross section." The investigation is inherent in the process and the results of the investigation are depicted in Figures 33a-d, 34 a-d and 36-43, as originally filed. Applicant respectfully asserts this rejection is traversed.

Claim 30 as amended recites:

> A method of generating a cube illustrating a set of characteristics of an earth formation disposed within a cubic volume of earth, said cube including a plurality of cross sections, each cross section including a plurality of scattered data samples, each cross section being gridded and including a plurality of intersections, comprising the steps of:

> (a) investigating the properties of the plurality of scattered data samples by determining a plurality of cumulative distribution functions corresponding, respectively, to the plurality of intersections for each of said plurality of cross sections;
> (b) selecting a value from each of said cumulative distribution functions thereby selecting a plurality of values corresponding, respectively, to said plurality of cumulative distribution functions for each of said plurality of cross sections;
> (c) assigning said plurality of values, respectively, to said plurality of intersections for each of said plurality of cross sections; and
> (d) assigning a plurality of unique colors, respectively, to said plurality of values assigned, respectively, to said plurality of intersections.

As described in this response to claim 1, the cited references do not disclose "investigating the properties of the plurality of scattered data samples by determining a plurality of cumulative distribution functions corresponding, respectively, to the plurality of intersections for each of said plurality of cross sections," or "selecting a value from each of said cumulative distribution functions thereby selecting a plurality of values corresponding, respectively, to said plurality of cumulative distribution functions for each of said plurality of cross sections;" or "assigning said plurality of values, respectively, to said plurality of intersections for each of said plurality of cross sections," or "assigning a plurality of unique colors, respectively, to said plurality of values assigned, respectively, to said plurality of intersections." Therefore, Applicant respectfully asserts that this rejection is traversed and requests reconsideration of this claim

P. Claims 31-35

Claims 31-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker** and, variously, in combination with **Journel,**

Hogg and **Webber** for the reasons described with respect to claims 2-14. Claims 31-35 are dependent, directly or indirectly, on claim 30 and contain all of its limitations. For the reasons described above with respect to claim 30 and claims 2-14, it is believed that claims 31-35 are patentably distinguishable from the cited references and that this rejection is traversed. Applicant respectfully requests reconsideration of these claims.

Q. Claim 36

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker**. Claim 36 has been amended. No new matter has been added. Support for this amendment is found throughout the Specification as originally filed. For example, the problem is discussed (in conjunction with a discussion of the prior art's approach to the problem) at page 1, paragraph 3 ("The estimation at any special location (x,y,z) of the value of a parameter (i.e., a random variable), such as porosity or permeability, from a set of scattered observations of data representing such a parameter may be achieved by a method known as 'Kriging.'" The next paragraph explains the smoothing problem of this prior art.). Paragraph 9 on page 3 of the Specification clarifies that "it is a primary feature of the present invention to generate one or more maps representing the characteristics of a gridded cross section…in response to a plurality of scattered data samples on such cross section." The investigation is inherent in the process and the results of the investigation are depicted in Figures 33a-d, 34 a-d and 36-43, as originally filed. Applicant respectfully asserts this rejection is traversed.

Claim 36 is directed to a "program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps

for generating a cube..." and stands rejected for the reasons described with respect to claim 1.

As described in this response to the rejections cited against claim 1, the cited references do not disclose "investigating the properties of the plurality of scattered data samples by determining a plurality of cumulative distribution functions corresponding, respectively, to the plurality of intersections for each of said plurality of cross sections;" or "selecting a value from each of said cumulative distribution functions thereby selecting a plurality of values corresponding, respectively, to said plurality of cumulative distribution functions for each of said plurality of cross sections;" or "assigning said plurality of values, respectively, to said plurality of intersections for each of said plurality of cross sections;" or "assigning a plurality of unique colors, respectively, to said plurality of values assigned, respectively, to said plurality of intersections." Therefore, Applicant respectfully asserts that this rejection is traversed and requests reconsideration of this claim

R. Claims 37-41

Claims 37-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jones** in view of **Matteucci** and **Tucker** and, variously, in combination with **Journel, Hogg** and **Webber** for the reasons described with respect to claims 2-14. Claims 37-41 are dependent, directly or indirectly, on claim 36 and contain all of its limitations. For the reasons described above with respect to claim 36 and claims 2-14, Applicant respectfully asserts that claims 37-41 are patentably distinguishable from the cited references and requests reconsideration of these claims.

CONCLUSION

It is respectfully submitted that this application, as now amended, is in condition for allowance for the reasons stated above. Applicant respectfully requests reconsideration of this application and allowance of all its pending claims.

This amendment is intended to be a complete response to the Office Action dated November 14, 2003.

Respectfully submitted,

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Enclosures:

1. Transmittal Form (1 page).
2. Fee Transmittal and Authorization to Charge Deposit of Account (1 page).
3. Fee Determination Record (1 page).
4. Request for Continued Examination (1 page).
5. Response and Amendment to Final Office Action (34 pages).
6. Information Disclosure Statement (2 pages).
7. Acknowledgment Postcard.